



FIG. 1

```

<xsd:annotation>
  <xsd:documentation xml:lang="en">
    Product Specification Schema
  </xsd:documentation>
</xsd:annotation>
<!-- All available product specifications -->
<xsd:element name="specifications" type="SpecificationType"/>
<xsd:complexType name="SpecificationType">
  <xsd:sequence>
    <xsd:element name="productSpecification" type="ProductSpecification"
      maxOccurs="unbounded"/>
    </xsd:sequence>
  </xsd:complexType>
<!-- Specific type of product -->
<xsd:complexType name="ProductSpecification">
  <xsd:sequence>
    <!-- Characteristics are divided into parameters and accessories -->
    <!-- Parameters define more of the core characteristics of the product. -->
    <xsd:element name="parameters" type="ParameterType" minOccurs="0"/>
    <!-- Whereas accessories are more of add-on optional items -->
    <xsd:element name="accessories" type="AccessoryType" minOccurs="0"/>
  </xsd:sequence>
  <xsd:attribute name="name" type="non-empty-string" use="required"/>
  <xsd:attribute name="uniqueIdentifier" type="xsd:string" use="required"/>
</xsd:complexType>

```

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FIG. 2A

```

<xsd:complexType name="ParameterType">
  <xsd:sequence>
    <xsd:element name="parameter" maxOccurs="unbounded">
      <xsd:complexType>
        <xsd:attribute name="name" type="non-empty-string" use="required"/>
        <xsd:attribute name="description" type="non-empty-string" use="optional"/>
        <xsd:attribute name="type" use="required">
          <xsd:simpleType>
            <xsd:restriction base="xsd:string">
              <xsd:enumeration value="java.lang.String"/>
              <xsd:enumeration value="java.lang.Double"/>
              <xsd:enumeration value="java.lang.Boolean"/>
            </xsd:restriction>
          </xsd:simpleType>
        </xsd:attribute>
        <xsd:attribute name="indexedField" use="optional">
          <xsd:simpleType>
            <xsd:restriction base="xsd:string">
              <xsd:enumeration value="true"/>
            </xsd:restriction>
          </xsd:simpleType>
        </xsd:attribute>
        <xsd:attribute name="grooming" use="optional">
          <xsd:simpleType>
            <xsd:restriction base="xsd:string">
              <xsd:enumeration value="translate"/>
              <xsd:enumeration value="numericFormat"/>
              <xsd:enumeration value="trimLeadingZeros"/>
              <xsd:enumeration value="removeMultipleValues"/>
            </xsd:restriction>
          </xsd:simpleType>
        </xsd:attribute>
      </xsd:complexType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>

```

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FIG. 2B

```

</xsd:attribute>
<xsd:attribute name="emptyValueEqualsNull" use="required">
  <xsd:simpleType>
    <xsd:restriction base="xsd:string">
      <xsd:enumeration value="true"/>
      <xsd:enumeration value="false"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:attribute>
</xsd:complexType>
</xsd:element>
</xsd:sequence>
</xsd:complexType>
<xsd:simpleType name="non-empty-string">
  <xsd:restriction base="xsd:string">
    <xsd:minLength value="1"/>
  </xsd:restriction>
</xsd:simpleType>
</xsd:complexType name="AccessoryType">
<xsd:sequence>
  <xsd:element name="accessory" maxOccurs="unbounded">
    <xsd:complexType>
      <xsd:attribute name="name" type="non-empty-string" use="required"/>
      <xsd:attribute name="description" type="non-empty-string" use="optional"/>
      <xsd:attribute name="type" use="required">
        <xsd:simpleType>
          <xsd:restriction base="xsd:string">
            <xsd:enumeration value="java.lang.String"/>
            <xsd:enumeration value="java.lang.Double"/>
            <xsd:enumeration value="java.lang.Boolean"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:attribute>
    </xsd:complexType>
  </xsd:element>
</xsd:sequence>

```

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FIG. 2C

```

218      </xsd:attribute>
      <xsd:attribute name="grooming" use="optional">
        <xsd:simpleType>
          <xsd:restriction base="xsd:string">
            <xsd:enumeration value="translate"/>
            <xsd:enumeration value="numericFormat"/>
            <xsd:enumeration value="trimLeadingZeros"/>
            <xsd:enumeration value="removeMultipleValues"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:attribute>
      <xsd:attribute name="emptyValueEqualsNull" use="required">
        <xsd:simpleType>
          <xsd:restriction base="xsd:string">
            <xsd:enumeration value="true"/>
            <xsd:enumeration value="false"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:attribute>
    </xsd:complexType>
  </xsd:element>
</xsd:sequence>
</xsd:complexType>
</xsd:schema>

```

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FIG. 2D

```

300 { <xsd:annotation>
      <xsd:documentation xml:lang="en">
        Product Search Configuration Schema
      </xsd:documentation>
    </xsd:annotation>

302 { <!-- There may be many search configurations, one for each type of product.
      They can be dynamically configured as needed. -->
      <xsd:element name="searchConfigurations" type="SearchConfigurationType"/>
      <xsd:complexType name="SearchConfigurationType">
        <xsd:sequence>
          <xsd:element name="productSearchConfiguration" type="ProductSearchConfigurationType"
            maxOccurs="unbounded"/>
        </xsd:sequence>
      </xsd:complexType>
    <!-- Search configuration for a specific type of product -->
    <xsd:complexType name="ProductSearchConfigurationType">
      <xsd:sequence>
        <!-- Product Characteristics listed here are required to match, regardless of how "close"
          a match is requested -->
        <xsd:element name="requiredToMatch" type="RequiredToMatchType" minOccurs="0"
          maxOccurs="1"/>
        <!-- Default Values to use in search for a characteristic that has no value -->
        <xsd:element name="defaultValues" type="SearchGroupingType" minOccurs="0" maxOccurs="1"/>
        <!-- Transformation of data to "normalize" values -->
        <xsd:element name="transformations" type="SearchGroupingType" minOccurs="0"
          maxOccurs="1"/>
        <!-- Identifies the type of comparison to use on each characteristic -->
        <xsd:element name="comparisons" type="SearchGroupingType" minOccurs="1" maxOccurs="1"/>
        <!-- Assigns a weight to each characteristic. This is used in determining how well a
          "close" match fits. -->
        <xsd:element name="weighting" type="SearchGroupingType" minOccurs="1" maxOccurs="1"/>
      </xsd:sequence>
      <xsd:attribute name="name" type="non-empty-string" use="required"/>
      <xsd:attribute name="percentageOfSuppliedCharacteristicsToMatch" type="percentage"
        use="required"/>
    }

```

FIG. 3A

```

304 {
    </xsd:complexType>
    <xsd:complexType name="RequiredToMatchType">
        <xsd:sequence>
            <xsd:element name="parameters" type="RequiredParameterType" minOccurs="0" maxOccurs="1"/>
            <xsd:element name="accessories" type="RequiredAccessoryType" minOccurs="0" maxOccurs="1"/>
        </xsd:sequence>
    </xsd:complexType>
}

306 {
    <xsd:complexType name="SearchGroupingType">
        <xsd:sequence>
            <xsd:element name="parameters" type="SearchParameterType" minOccurs="0" maxOccurs="1"/>
            <xsd:element name="accessories" type="SearchAccessoryType" minOccurs="0" maxOccurs="1"/>
        </xsd:sequence>
        <xsd:attribute name="defaultValue" type="non-empty-string"/>
    </xsd:complexType>
}

308 {
    <xsd:complexType name="SearchParameterType">
        <xsd:sequence>
            <xsd:element name="parameter" minOccurs="0" maxOccurs="unbounded">
                <xsd:complexType>
                    <xsd:attribute name="name" type="non-empty-string" use="required"/>
                    <xsd:attribute name="value" type="non-empty-string" use="required"/>
                </xsd:complexType>
            </xsd:element>
        </xsd:sequence>
        <xsd:attribute name="defaultValue" type="non-empty-string"/>
    </xsd:complexType>
}

310 {
    <xsd:complexType name="SearchAccessoryType">
        <xsd:sequence>
            <xsd:element name="accessory" minOccurs="0" maxOccurs="unbounded">
                <xsd:complexType>
                    <xsd:attribute name="name" type="non-empty-string" use="required"/>
                    <xsd:attribute name="value" type="non-empty-string" use="required"/>
                </xsd:complexType>
            </xsd:sequence>
        </xsd:complexType>
    </xsd:complexType>
}

```

FIG. 3B

```

310      </xsd:sequence>
      <xsd:attribute name="defaultValue" type="non-empty-string"/>
    </xsd:complexType>
    <xsd:complexType name="RequiredParameterType">
      <xsd:sequence>
        <xsd:element name="parameter" minOccurs="1" maxOccurs="unbounded">
          <xsd:complexType>
            <xsd:attribute name="name" type="non-empty-string" use="required"/>
          </xsd:complexType>
        </xsd:element>
      </xsd:sequence>
    </xsd:complexType>
    <xsd:complexType name="RequiredAccessoryType">
      <xsd:sequence>
        <xsd:element name="accessory" minOccurs="1" maxOccurs="unbounded">
          <xsd:complexType>
            <xsd:attribute name="name" type="non-empty-string" use="required"/>
          </xsd:complexType>
        </xsd:element>
      </xsd:sequence>
    </xsd:complexType>
    <xsd:simpleType name="non-empty-string">
      <xsd:restriction base="xsd:string">
        <xsd:minLength value="1"/>
      </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="percentage">
      <xsd:restriction base="xsd:nonNegativeInteger">
        <xsd:minInclusive value="0"/>
        <xsd:maxInclusive value="100"/>
      </xsd:restriction>
    </xsd:simpleType>
  </xsd:schema>

```

FIG. 3C



```

400  = <specifications>
      : <productSpecification name="E_Transformer" uniqueIdentifier="indexNumber">
        : <parameters>
          <parameter name="indexNumber" type="java.lang.String" grooming="trimLeadingZeros"
            emptyValueEqualsNull="true" />
          <parameter name="type" type="java.lang.String" emptyValueEqualsNull="true" />
          <parameter name="designNumber" type="java.lang.String" emptyValueEqualsNull="true" />
          <parameter name="ratedPowerKVA" description="KVA Rating" type="java.lang.Double" indexedField="true"
            emptyValueEqualsNull="true" />
          <parameter name="ratedPowerLV1" type="java.lang.Double" emptyValueEqualsNull="true" />
          <parameter name="ratedPowerLV2" type="java.lang.Double" emptyValueEqualsNull="true" />
          <parameter name="primaryVoltageHv1" type="java.lang.Double" emptyValueEqualsNull="true" />
          <parameter name="primaryVoltageHv2" type="java.lang.Double" emptyValueEqualsNull="true" />
          <parameter name="secondaryVoltageLv1" type="java.lang.Double" emptyValueEqualsNull="true" />
          <parameter name="secondaryVoltageLv2" type="java.lang.Double" emptyValueEqualsNull="true" />
          <parameter name="tappingOnPrimary" type="java.lang.String" emptyValueEqualsNull="true" />
          <parameter name="connectionSymbol" type="java.lang.String" emptyValueEqualsNull="true" />
          <parameter name="impedanceVoltage" type="java.lang.Double" emptyValueEqualsNull="true" />
          <parameter name="typeOfCooling" type="java.lang.String" emptyValueEqualsNull="true" />
          <parameter name="noLoadLoss" type="java.lang.Double" emptyValueEqualsNull="true" />
          <parameter name="loadLoss" type="java.lang.Double" emptyValueEqualsNull="true" />
          <parameter name="maxAmbientTemp" type="java.lang.Double" emptyValueEqualsNull="true" />
          <parameter name="maxTempOfWindingsRise" type="java.lang.Double" emptyValueEqualsNull="true" />
          <parameter name="maxTempOfOilRise" type="java.lang.Double" emptyValueEqualsNull="true" />
          <parameter name="noiseLevel" type="java.lang.Double" emptyValueEqualsNull="true" />
          <parameter name="insulationLevelHv1" type="java.lang.String" emptyValueEqualsNull="true" />
          <parameter name="insulationLevelLv1" type="java.lang.String" emptyValueEqualsNull="true" />
          <parameter name="maxAltitude" type="java.lang.Double" emptyValueEqualsNull="true" />
          <parameter name="totalWeight" type="java.lang.Double" emptyValueEqualsNull="true" />

```

FIG. 4A

410 {

```

<parameter name="preliminaryLength" type="java.lang.Double" emptyValueEqualsNull="true" />
<parameter name="preliminaryWidth" type="java.lang.Double" emptyValueEqualsNull="true" />
<parameter name="preliminaryHeight" type="java.lang.Double" emptyValueEqualsNull="true" />
<parameter name="standard" type="java.lang.String" grooming="translate" emptyValueEqualsNull="true" />
<parameter name="frequency" type="java.lang.Double" emptyValueEqualsNull="true" />
<parameter name="noLoadLossTolerance" type="java.lang.Double" emptyValueEqualsNull="true" />
<parameter name="loadLossTolerance" type="java.lang.Double" emptyValueEqualsNull="true" />
<parameter name="totalLossesTolerance" type="java.lang.Double" emptyValueEqualsNull="true" />
<parameter name="standardAccordingToCustSpec" type="java.lang.String" emptyValueEqualsNull="true" />
<parameter name="impedanceTolerance" type="java.lang.Double" emptyValueEqualsNull="true" />
<parameter name="lvWindingMaterial" type="java.lang.String" emptyValueEqualsNull="true" />
<parameter name="hvWindingMaterial" type="java.lang.String" emptyValueEqualsNull="true" />
<parameter name="noiseType" type="java.lang.String" emptyValueEqualsNull="true" />
<parameter name="loadLoss_2" type="java.lang.Double" emptyValueEqualsNull="true" />
<parameter name="primaryVoltageHv3" type="java.lang.Double" emptyValueEqualsNull="true" />
<parameter name="tappingOnPrimaryHv2" type="java.lang.String" emptyValueEqualsNull="true" />
<parameter name="tappingOnPrimaryHv3" type="java.lang.String" emptyValueEqualsNull="true" />
<parameter name="costToManufacture" type="java.lang.Double" emptyValueEqualsNull="true" />
<parameter name="productDescription" type="java.lang.String" emptyValueEqualsNull="true" />
</parameters>
= <accessories>
420 {
<accessory name="conservator" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="buchholzRelay" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="silicagelBreather" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="doubleContactThermometer" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="safetyValve" type="java.lang.String" emptyValueEqualsNull="true" />

```

FIG. 4B

```

<accessory name="magneticOilLevelIndicator" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="oilLevelIndicator" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="hvAirInsulatedCableBox" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="lvAirInsulatedCableBox" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="hvBushing" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="lv1Bushing" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="lv2Bushing" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="paintingSpecification" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="terminalBox" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="oilType" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="electrostaticScreen" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="protectionDevice" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="windingTempIndicator" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="overpressureSwitch" type="java.lang.String" emptyValueEqualsNull="true" />
<accessory name="finishPaintColor" type="java.lang.String" emptyValueEqualsNull="true" />
</accessories>
</productSpecification>
</specifications>

```

FIG. 4C

```

300  : <searchConfigurations>
      : <productSearchConfiguration name="E_Transformer" percentageOfSuppliedCharacteristicsToMatch="100">
          : <requiredToMatch>
              : <parameters>
                  <parameter name="ratedPowerKVA" />
              </parameters>
          </requiredToMatch>
          : <defaultValues>
              : <parameters>
                  <parameter name="noLoadLossTolerance" value="15" />
                  <parameter name="loadLossTolerance" value="15" />
                  <parameter name="totalLossesTolerance" value="10" />
                  <parameter name="standard" value="IECOIL" />
              </parameters>
          </defaultValues>
          : <transformations>
              : <parameters>
                  <parameter name="tappingOnPrimary" value="CompressSpaces" />
                  <parameter name="tappingOnPrimaryHv2" value="CompressSpaces" />
                  <parameter name="tappingOnPrimaryHv3" value="CompressSpaces" />
              </parameters>
          </transformations>
          : <comparisons default Value="ExactMatch">
              : <parameters>
                  <parameter name="lvWindingMaterial" value="IgnoreCase" />
                  <parameter name="hvWindingMaterial" value="IgnoreCase" />
                  <parameter name="totalWeight" value="DoNotExceed" />
                  <parameter name="preliminaryLength" value="DoNotExceed" />
                  <parameter name="preliminaryWidth" value="DoNotExceed" />
                  <parameter name="preliminaryHeight" value="DoNotExceed" />
              </parameters>
          </comparisons>
      </productSearchConfiguration>
  </searchConfigurations>

```

FIG. 5A

510

```

</comparisons>
: <weighting defaultValue="1">
:   <parameters defaultValue="2">
      <parameter name="ratedPowerKVA" value="3" />
      <parameter name="ratedPowerLV1" value="3" />
      <parameter name="ratedPowerLV2" value="3" />
      <parameter name="primaryVoltageHv1" value="3" />
      <parameter name="primaryVoltageHv2" value="3" />
      <parameter name="secondaryVoltageLv1" value="3" />
      <parameter name="secondaryVoltageLv2" value="3" />
      <parameter name="connectionSymbol" value="3" />
      <parameter name="impedanceVoltage" value="3" />
      <parameter name="typeOfCooling" value="3" />
      <parameter name="noLoadLoss" value="3" />
      <parameter name="loadLoss" value="3" />
      <parameter name="frequency" value="3" />
      <parameter name="noLoadLossTolerance" value="3" />
      <parameter name="loadLossTolerance" value="3" />
      <parameter name="totalLossesTolerance" value="3" />
      <parameter name="loadLoss_2" value="3" />
      <parameter name="primaryVoltageHv3" value="3" />
    </parameters>
  </weighting>
</productSearchConfiguration>
</searchConfigurations>

```

FIG. 5B

```

- <parameters>
<ratedPowerKva value="800" />
<ratedPowerLv1 value="800" />
<ratedPowerLv2 value="" />
<primaryVoltageHv1 value="11500" />
<primaryVoltageHv2 value="" />
<secondaryVoltageLv1 value="420" />
<secondaryVoltageLv2 value="" />
<tappingOnPrimary value="+2 -2 2.5%" />
<connectionSymbol value="Dyn11" />
<impedanceVoltage value="6" />
<typeOfCooling value="ONAN" />
<noLoadLoss value="1300" />
<loadLoss value="10000" />
<maxAmbientTemp value="40" />
<maxTempOfWindingsRise value="65" />
<maxTempOfOilRise value="60" />
<noiseLevel value="71" />
<insulationLevelHv1_AC value="28" />
<insulationLevelHv1_BIL value="75" />
<insulationLevelLv1_AC value="3" />
<insulationLevelLv1_BIL value="0" />
<maxAltitude value="1000" />
<totalWeight value="2210" />
<weightOfOil value="498" />
<preliminaryLength value="1680" />
<preliminaryWidth value="1030" />
<preliminaryHeight value="1530" />

```

FIG. 6A

```

610 <standard value="IECOIL" />
    <numberOfPhases value="3" />
    <frequency value="50" />
    <noLoadCurrent value="1" />
    <noLoadLossTolerance value="15" />
    <loadLossTolerance value="15" />
    <totalLossesTolerance value="10" />
    <standardAccordingToCustSpec value="" />
    <impedanceTolerance value="10" />
    <lvWindingMaterial value="AL" />
    <hvWindingMaterial value="CU" />
    <noiseType value="LPA" />
    <loadLoss_2 value="" />
    <primaryVoltageHv3 value="" />
    - <accessories>
        <accessorie description="Hermetically sealed tank" type="TANK.TANK.HERM" />
        <accessorie description="Porcelain bushings" quantity="4" type="BUSH.BPOR.B001" section="LV1" />
        <accessorie description="Porcelain bushings" quantity="3" type="BUSH.BPOR.B001" section="HV1" />
        <accessorie description="Earthing terminals" quantity="2" type="EART.TERM.A001" />
        <accessorie description="Standard Drain Valve" type="VALV.VLVD.A001" />
        <accessorie description="Adhesive Rating Label" type="TAGS.RATI.STDR" />
        <accessorie description="Rating Plate/Label Fixed" type="TAGS.MNTY.FIXD" />
        <accessorie description="Bi-directional rollers" type="TANK.BASE.ROLL" />
        <accessorie description="5-step off-circuit changer (NLTC)" type="TAPCNG.VCNG.NL5" section="HV1" />
    </accessories>
    <accessorie description="05.0051W Std water-based 120-200um" type="SURF.PNTS.PNS1" />
    <accessorie description="Test for alternate accessorie fields" type="LIQI.LLEV.CINC" />
    <accessorie description="Nynas Nytro 10GBN" type="OIL.OTPU.NYNU" />
    </accessories>
    </parameters>
620

```

FIG. 6B